

CLAIMS

What is claimed is:

- 1 *Sub a27* 1. A method for automated monitoring of quality of service of digital video material
2 being distributed and played, the method comprising:
3 embedding a signature in each frame of the digital video material by a program source
4 device control; and
5 computing play-out statistics for the digital video material based on the signature by a
6 program play-out device control.
7
8 2. The method of claim 1 wherein the step of embedding further comprises utilizing a
9 hashing algorithm to produce the signature for each frame in the digital video material during
10 encoding of the digital video material.
11
12 3. The method of claim 2 further comprising providing a key identifier in a header of the
13 signature and identifying inclusion of the signature based on the key identifier.
14
15 4. The method of claim 2 wherein embedding further comprises creating a meta-stream
16 for the digital video material and encrypting the meta-stream.
17
18 5. The method of claim 4 wherein the meta-stream further comprises a header session.

1 6. The method of claim 5 wherein the header session further comprises an identifier, a
2 length, and a time of play-out of the digital video material.

1 7. The method of claim 4 wherein the step of computing statistics further comprises
2 capturing the meta-stream and computing the signature for an incoming stream of digital video
3 material.

1 8. The method of claim 7 further comprising utilizing the signature of the meta-stream to
2 trigger comparison with the computed signature of the incoming stream of digital video material.

1 9. The method of claim 8 further comprising computing a number of frames having a
2 matching signature to the computed signature, identifying a time of play-out for the video stream,
3 and determining a duration of the digital video material played-out.

1 10. The method of claim 9 further comprising storing the play-out statistics on a local
2 storage device for the play-out device control.

1 11. The method of claim 10 further comprising transmitting the play-out statistics back
2 for the program source device control for quality of service measurements.

1 12. The method of claim 1 wherein the digital video material further comprises a digital
2 advertisement.

1 13. A system for automated monitoring of quality of service of digital video material
2 being distributed and played, the system comprising:

3 a program source of viewing program data, the program source embedding a signature in
4 each frame of digital video material within the viewing program data;

5 a play-out device for receiving the viewing program data and computing play-out
6 statistics for the digital video material based on the signature; and

7 a display device coupled to the play-out device for displaying video output of the viewing
8 program data from the play-out device.

14. The system of claim 13 wherein the viewing program data further comprises a cable
station program feed.

15. The system of claim 13 wherein the viewing program data further comprises a
satellite program feed.

16. The system of claim 13 wherein the viewing program data further comprises an air
wave program feed.

17. The system of claim 13 wherein the play-out device further comprises a set-top cable
box.

18. The system of claim 13 wherein the play-out device further comprises a cable head-

2 ~~end.~~

1 19. The system of claim 13 wherein the play-out device further comprises a computer.

1 20. The system of claim 13 wherein the digital video material further comprises a digital
2 advertisement.

1 21. The system of claim 13 wherein the program source further provides the signature in
2 a meta-stream, the meta-stream including an identifier for the digital video material, a length of
3 the digital video material, and a time for play-out of the digital video material.

4 22. The system of claim 21 wherein the play-out device further computes play-out
statistics by capturing the meta-stream, computing a signature for the digital video material, and
comparing the computed signature to the provided signature.

1 23. The system of claim 22 wherein the video play-out device further computes statistics
2 by computing a number of frames in the digital video material having a match condition with the
3 signature, identifying a time of play-out of the digital video material, and determining a duration
4 of the digital video material actually played-out.

1 24. The system of claim 23 wherein the video play-out device stores the play-out
2 statistics in a local storage and transmits the play-out statistics to the program source, wherein the
3 program source measures quality of service for the digital video material from automated analysis
4 of the play-out statistics.

1 29. The method of claim 28 further comprising providing the play-out statistics to the
2 program source, and analyzing the play-out statistics to determine quality of digital advertisement
3 display.

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